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PRELIMINARY ANALYSIS OF THE VERTEBRATE FOSSIL  
FAUNA OF THE BOYSEN RESERVOIR AREA

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As a part of the salvage program of the River Basin Surveys, a cooperative project between the Smithsonian Institution, the National Park Service, the Bureau of Reclamation, and the Corps of Engineers, Department of the Army, in the prospective reservoir sites in the Missouri Valley, the Boysen Reservoir area near Shoshoni, Wyo., has been prospected for vertebrate fossils for parts of two seasons. During the first period, from October 23 to November 7, 1947, I worked alone, and considerable time was lost because of early snows. The area was again worked, with the aid of John C. Donohoe, a student at Montana State College, and Ernest L. Lundelius, a student at the University of Texas, from June 4 to July 12, 1948. Although the specimens have not been credited to individuals, I wish to state that these men have proved themselves competent collectors, and we three found about equal amounts of material. Although it is planned to visit this area for as many seasons as possible before the reservoir is flooded, it seems desirable to make the information gathered to date available to other paleontologists.

## SYSTEMATIC DESCRIPTION OF FOSSIL VERTEBRATES

## Class REPTILIA

## Order SQUAMATA

## Suborder SERPENTES

## Family BOIDAE

## Genus BOAVUS Marsh

## BOAVUS cf. OCCIDENTALIS Marsh

About 30 associated thoracic vertebrae (loc. No. 48FR78);<sup>1</sup> 2 thoracic vertebrae (loc. No. 48FR80).

Although there is considerable difference in size between the two specimens, I am inclined to be extremely cautious about differentiating species of snakes on the size of the vertebrae only, since age is not readily reflected in the surface texture of the bone. Consequently, the principal importance of this material is the presence of this genus in the Lost Cabin faunal zone of the Wind River formation.

## Suborder SAURIA

## Family VARANIDAE

## Genus SANIWA Leidy

## SANIWA sp.

One dorsal and five caudal vertebrae (loc. No. 48FR65); two dorsal vertebrae of presumably a young individual (loc. No. 48FR78); one caudal vertebra (loc. No. 48FR80).

This material is too imperfect for more than generic identification and its value is only that it establishes this genus in these deposits.

## Family ANGUIDAE

## Genus GLYPTOSAURUS Marsh

## GLYPTOSAURUS DONOHOEI, new species

## FIGURE 75

*Type*.—U.S.N.M. No. 18316 (fig. 75), a badly damaged skull lacking the tip of the snout, both maxillae, and the right temporal region (loc. No. 48FR65).

*Referred material*.—U.S.N.M. No. 18317, skull and jaw fragments with scutes (loc. No. 48FR65).

<sup>1</sup> For a description of localities see pp. 203-206.

*Horizon and locality.*—Lower Eocene, Lost Cabin, NE $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 5, T. 4 N., R. 6 E., of Wind River meridian; White Hill, south side of Cottonwood (Dry Muddy) Creek, 11 miles north-northwest (air line) of Shoshoni, Fremont County, Wyo.

*Diagnosis.*—A medium-sized species; interorbital breadth 33 percent less than in *G. hillsi* Gilmore; interorbital area with 5 regular alternating rows of bony scutes, supraorbital and median rows larger

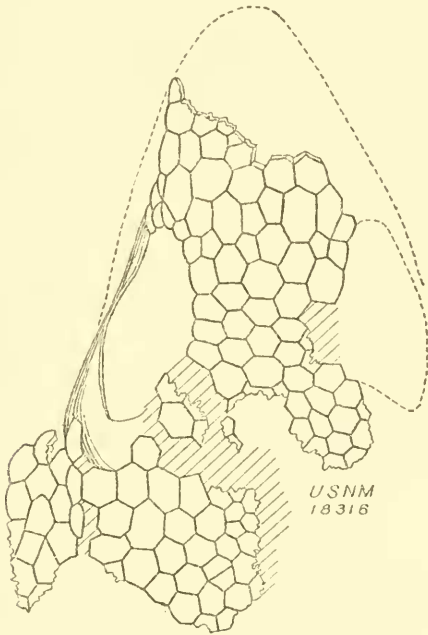


FIGURE 75.—*Glyptosaurus donohoei*, new species, type, U.S.N.M. No. 18316; squamation of dorsal surface of skull,  $\times 1$ .

than second and fourth rows; scutes raised into a boss as in *rugosus* and *nodosus*; vertical diameter of orbit equal to interorbital breadth; scutes of the temporal region less regular in outline and about twice the diameter of those of the interorbital area.

*Discussion.*—This specimen, in conjunction with a braincase from Pipestone Springs (U.S.N.M. No. 13805), permits a few additions to Gilmore's (1928, 1938) discussions of the genus.

The various elements that make up the braincase are securely fused, as in *Peltosaurus*. The former location of some of the sutures can be made out by lines of roughened bone. The condyle is elongate-oval in outline, twice as broad as deep. The tubera basioccipitalia project ventrolaterally from the basicranial axis and are expanded anteriorly and posteriorly at their bases as though reinforced by flying buttresses. These expansions are thickened along their edges so that the

tubera are triradiate from their terminations, with the median portion the heaviest. The foramen for the twelfth cranial nerve is located beside the condyle and below the paroccipital process, at the termination of the posterior wing of the tubera basioccipitalia. The ninth and tenth nerves exit through a dorsoventrally elongated foramen at the ventral side of the jugular groove a little posterior to the median portion of the tubera basioccipitalia. The fenestra ovale lies just above this foramen. The foramen for the exit of the *venus capitis lateralis* lies just above the anterior termination of the anterior wing of the tubera at the bottom of the jugular groove. The foramen for the hyoid branch of the seventh nerve lies at the top of the jugular groove slightly posterior to the foramen for the *venus capitis lateralis*. A thin, fairly deep ridge of bone extends downward from the paroccipital process of the proötic so that the jugular groove is partially enclosed laterally.

The region of the hypophyseal fontanelle is so badly damaged in both specimens that reliable data cannot be obtained. The basiptyergoid processes of the basisphenoid are elongate and flattened as in most *Sauria*. They are separated from the tubera basioccipitalia by a deep notch, which extends to the main body of the basisphenoid.

The anterior edge of the proötic is damaged in both specimens, but enough of this region is preserved in U.S.N.M. No. 18316 to indicate that the ossification of the prefacial commissure very nearly or entirely encircled the facialis branch of the seventh nerve as it left the braincase.

A fragment of the maxilla in U.S.N.M. No. 18317 shows that the anterior maxillary teeth are much smaller than the posterior teeth. They increase rapidly in size to the fifth tooth, which is as large as the remainder.

The collection of *Glyptosaurus* material in the United States National Museum, which contains most of the types, was examined in connection with this material. Many of the species were founded on the characters of the frontal and interorbital regions only, and as yet some of the species are known only from the type specimens. Although the taxonomy of a genus based on such a limited portion of an animal leaves much to be desired, it is possible to make a morphological grouping of the species of this genus by means of the characters presented by this region of the skull. Only with the aid of better material can the validity of this grouping be determined. The known species are tentatively grouped as follows:

- I. Interorbital region with four rows of osseus scutes with one or two odd scutes interpolated between the median rows.....*G. montanus* group
- II. Interorbital region with five regular, alternating rows of osseus scutes.  
*G. hillsi* group

- III. Interorbital region with six irregular rows of scutes; odd scutes may or may not be present between the median rows.....G. giganteus group  
 IV. Frontal region unknown.....G. sphenodon

TABLE 1.—Stratigraphical distribution of the *Glyptosaurus montanus*, *G. hillsi*, and *G. giganteus* groups

Periods	Stages	<i>montanus</i> group	<i>hillsi</i> group	<i>giganteus</i> group
Oligocene	Whitneyan			
	Orellan			<i>giganteus</i>
	Chadronian	<i>montanus</i>		<i>tuberculatus</i>
Eocene	Duchesnian			
	Uintan			
	Bridgerian		<i>brevidens princeps</i>	<i>nodosus sylvestris rugosus</i>
	Huerfano B		<i>hillsi</i>	
	Huerfano A		<i>hillsi?</i>	
	Wasatchian	<i>obtusidens</i>	<i>donohoei</i>	

## Class MAMMALIA

### Order INSECTIVORA

#### Family DELTATHERIDIIDAE

##### Genus DIDELPHODUS Cope

##### DIDELPHODUS VENTANUS Matthew

##### FIGURE 76

U.S.N.M. No. 18369 (fig. 76), a badly crushed skull with left  $P^2$  to  $M^3$  and both lower jaws from which all the teeth have been broken (loc. No. 48FR65); U.S.N.M. No. 18433, fragment of left mandible with  $M_2$  (loc. No. 48FR80).

If the skull is correctly referred to this form its characters are sufficiently distinctive to warrant designation as a separate species, rather than citation as a mutation of *D. absarokae*. The distinctive characters presented by the teeth of this specimen are:  $P^2$  two-rooted, anterior and posterior cingula well developed and with minute crenulations;  $P^3$  submolariform and differs from  $P^4$  only in being slightly smaller;  $M^1$  exhibits several minute tubercles on the external cingulum between the parastyles and metastyles. Other characters

of the teeth agree with Matthew's (1918, p. 583) figures of *D. absarokae*.

Although this skull is very badly broken and crushed, it adds a few details to our knowledge of the genus. Because *Ictops* is relatively well known, comparisons will be made with it, although the two forms are not closely related:

(1) The frontonasal suture lies a short distance in front of the orbit. (2) The zygoma is a little heavier than in *Ictops*. (3) Post-orbital process is short but very well defined. A companion process was not observed on the fragment of the zygoma preserved. (4) The orbit appears to be as large relatively as in *Ictops*. (5) The sagittal crest is single and moderately high. (6) The parietal foramen appears to lie closer to the crest than to the squamosal. (7) Squamosoparietal



FIGURE 76.—*Didelphodus ventanus* Matthew, U.S.N.M. No. 18369; occlusal view of left P<sup>2</sup>-M<sup>3</sup>,  $\times 4$ .

foramina were not observed. (8) The union of the mastoid portion of the petrosal and the squamosal appears to have been similar to that in *Ictops*. (9) The mastoid appears to form as much of the occiput as in *Ictops*. (10) The relationship of the glenoid to the periotic suggests that the postglenoid and posttympanic processes of the squamosal were separated by a meatal notch, although these processes were broken away. (11) The tympanic ridge of the alisphenoid is lacking, but there is a short one on the glenoid portion of the squamosal. (12) The foramina in the alisphenoid appear to have been much the same as in *Ictops*, but this region is badly crushed and difficult of interpretation. (13) The alisphenoid appears to be fused to the basisphenoid. (14) The periotic appears to be rather large judged by the dimensions of the skull that can be observed. (15) The inferior border of the masseteric fossa is sharply defined by an abrupt indentation as in *Deltatheridium*.

MEASUREMENTS OF TEETH OF DIDELPHODUS VENTANUS (IN MILLIMETERS)

	Length	Width
P <sup>3</sup> -M <sup>3</sup> .....	13.5	-----
M <sup>1-3</sup> .....	8.0	-----
Diastema P <sup>2-3</sup> .....	1.6	-----
P <sup>2</sup> .....	2.1	1.2
P <sup>3</sup> .....	2.8	3.2
P <sup>4</sup> .....	2.6	3.4
M <sup>1</sup> .....	3.0	3.5
M <sup>2</sup> .....	2.4	3.5
M <sup>3</sup> .....	1.7	3.0

The dentition of this specimen is distinctly more advanced than that of *D. absarokae* of the Gray Bull. Unfortunately the upper dentition of this genus is unknown from the Alkalai Creek exposures. Consequently it is impossible to evaluate the stratigraphic significance of this specimen.

### Family MIXODECTIDAE

#### Genus CYNODONTOMYS Cope

#### CYNODONTOMYS SCOTTIANUS COPE

U.S.N.M. No. 18436, fragment of left mandible with posterior half of  $P_4$  and  $M_{1-3}$  (loc. No. 48FR76); U.S.N.M. No. 18434, fragment of right mandible with  $M_{2-3}$  (loc. No. 48FR80).

The limited material pertaining to this species does not permit any additions to Matthew's (1915c, pp. 470-477) discussion of the genus.

#### CYNODONTOMYS LUNDELIUSI, new species

#### FIGURE 77

*Holotype*.—U.S.N.M. No. 18371 (fig. 77), fragment of a right mandible with posterior half of  $M_1$ ,  $M_2$ , posterior half of  $M_3$ , and the roots of  $P_{3-4}$  (loc. No. 48FR65).

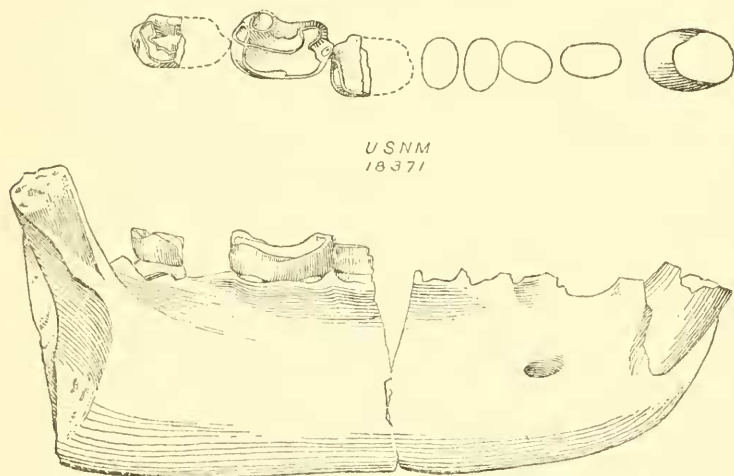


FIGURE 77.—*Cynodontomys lundeliusi*, new species, type, U.S.N.M. No. 18371; occlusal view of teeth and lateral view of right mandible,  $\times 2$ .

*Horizon and locality*.—Lower Eocene, Lost Cabin.  $NW\frac{1}{4}SW\frac{1}{4}$ , sec. 5, T. 4 N., R. 6 E. of Wind River meridian, south side of Cottonwood (Dry Muddy) Creek, 11 miles (air line) north-northwest of Shoshoni, Fremont County, Wyo.

*Diagnosis*.—Size large, 33 percent larger than the average for *C. scottianus* (Matthew, 1915c, p. 471);  $M_3$  relatively shorter than in that species; heel of  $M_3$  narrower than on  $M_2$ ; paraconid on  $M_2$  distinct; external and posterior cingula as in *C. scottianus*.

*Discussion.*—Although the teeth in this specimen are broken and badly worn, the characters presented, especially the size, are distinct enough for the species to be easily recognized.

MEASUREMENTS OF TEETH OF CYNODONTOMYS LUNDELIUSI (IN MILLIMETERS)

	<i>Length</i>
P <sub>3</sub> -M <sub>3</sub> .....	30.7
P <sub>4</sub> -M <sub>3</sub> .....	22.3
M <sub>1</sub> (estimated) .....	5.0
M <sub>2</sub> .....	5.5
M <sub>3</sub> .....	6.5
Depth of jaw at M <sub>1</sub> .....	12.8
Depth of jaw at M <sub>3</sub> .....	13.7

## Order TILLODONTIA

### Family TILLOTHERIIDAE

#### Genus ESTHONYX Cope

##### ESTHONYX ACUTIDENS Cope

U.S.N.M. No. 18267, fragment of right mandible with I<sub>2-3</sub> and P<sub>3</sub>-M<sub>2</sub> (loc. No. 48FR78); U.S.N.M. No. 18470, fragments of both mandibles (loc. No. 48FR65); U.S.N.M. No. 18469, skull and jaw fragments (loc. No. 48FR80).

This material is being studied by Dr. C. L. Gazin and will be discussed in his revision of the order.

## Order PRIMATES

### Family ADAPIDAE

#### Genus NOTHARCTUS Leidy

##### NOTHARCTUS VENTICOLUS Osborn

U.S.N.M. No. 18437, left mandible with M<sub>1-3</sub>, roots of P<sub>3-4</sub>, and alveoli of P<sub>1-2</sub> (loc. No. 48FR77).

This specimen does not add anything to our knowledge of the species.

### Family APATEMYIDAE

#### Genus TEILHARDELLA Jepson

##### TEILHARDELLA sp.

U.S.N.M. No. 18438, right mandible with only the incisor (loc. No. 48FR80).

This specimen is provisionally referred to this genus on the characters of the mandible, which exhibit a number of differences from the genotype, but these differences cannot be properly appraised until the dentition is known. The characters exhibited by this specimen are:



$P_3$  procumbent;  $P_4$  with a single large root;  $M_1$  and  $M_2$  with posterior root the larger; posterior root of  $M_3$  very long and narrow; masseteric fossa very deep and broad.

## MEASUREMENTS OF ALVEOLI OF TELHARDELLA sp. (IN MILLIMETERS)

	Length
$P_3$ - $M_3$ .....	7.8
$M_{1-3}$ .....	5.7
$M_1$ .....	1.7
$M_2$ .....	1.7
$M_3$ .....	2.0

## Family ANAPTOMORPHIDAE

## Genus LOVEINA Simpson

## LOVEINA ZEPHYRI Simpson

U.S.N.M. No. 18439, portion of a left mandible with part of  $P_4$ , the base of  $M_1$ , and  $M_2$  and  $M_3$  (loc. No. 48FR76).

This specimen is provisionally referred to this species on the basis that  $M_2$  and  $M_3$  agree with those of ? *L. vespertina* (Matthew) better than with those of any other genus. It differs from that species in the proportionally shorter  $M_1$  and  $M_2$ , in the broader trigonid, and in the presence of a minute entoconid on the heel of  $M_3$ . Since  $M_2$  and  $M_3$  are unknown in the genotype any attempt at comparison of the two specimens would be futile.

## MEASUREMENTS OF TEETH OF LOVEINA ZEPHYRI (IN MILLIMETERS)

	Length	Width (at base)	
		Trigonid	Heel
$M_{1-3}$ .....	7.4	-----	-----
$M_1$ .....	2.3	?	1.8
$M_2$ .....	2.3	2.0	2.2
$M_3$ .....	2.7	1.8	1.6

## Order TAENIODONTA

## Family STYLINODONTIDAE

## Genus STYLINODON Marsh

## STYLINODON CYLINDRIFER (Cope)

U.S.N.M. No. 18440, portion of right canine (loc. No. 48FR76).

This specimen is referred to *S. cylindrifera* on the basis of the distribution of the enamel, which is in two bands, one on each side of the tooth. It is of uniform thickness and width and shows the obsolete vertical striation and the stronger transverse growth lines which Cope (1884, p. 192) describes for the type of the species. The cement, which covers the areas between the enamel bands, overlaps the enamel for a short distance on each side, but there is no evidence that the bands were covered.

MEASUREMENTS OF CANINE OF *STYLINODON CYLINDRIFER* (IN MILLIMETERS)

Diameter (transverse)-----	10.5
Diameter (anteroposterior)-----	11.5
Width between enamel bands:	
Anterior-----	2.8
Posterior-----	4.8

## Order RODENTIA

## Family ISCHYROMYIDAE

Genus *PARAMYS* Leidy*PARAMYS MAJOR* Loomis

U.S.N.M. No. 18442, right mandibular fragment with  $M_{1-2}$  and roots of  $M_3$  (loc. No. 48FR76); U.S.N.M. No. 18441, left mandibular fragment with  $P_4-M_2$  (loc. No. 48FR80).

This material does not permit anything to be added to Matthew's (1918, p. 614) discussion of the species.

*PARAMYS MURINUS* Matthew

U.S.N.M. No. 18443, right mandible with  $M_{1-2}$  and roots of  $P_4$  (loc. No. 48FR80).

This specimen does not agree with the figures (Matthew, 1918, p. 617) of the type in that the enamel is entirely smooth and not rugose. Consequently, it is only provisionally referred to this species pending the acquisition of better material.

## Order CARNIVORA

## Family HYAENODONTIDAE

Genus *PROLIMNOCYON* Matthew*PROLIMNOCYON ANTIQUUS* Matthew

U.S.N.M. No. 18444, left mandible with  $P_{3-4}$  and roots of  $M_{2-3}$  (loc. No. 48FR76); U.S.N.M. No. 19445, both mandibles with only roots of teeth preserved (loc. No. 48FR65).

This material does not permit anything to be added to Matthew's (1915a, p. 70) discussion of the species.

Genus *SINOPA* Leidy*SINOPA STRENUA* (Cope)

U.S.N.M. No. 18446, mandibular fragments with  $M_{1-3}$  of both sides and associated skeletal fragments (loc. No. 48FR77).

This specimen does not permit the addition of anything to Matthew's (1915a, p. 74) discussion of the species.

## Genus DIDYMICTIS Cope

## DIDYMICTIS ALTIDENS Cope

U.S.N.M. No. 18447, skull with calvarium and occiput eroded away, right and left P<sup>1</sup>-M<sup>2</sup> present (loc. No. 48FR75).

This specimen differs from the one figured by Matthew (1915a, p. 23) in that P<sup>1</sup> is 2-rooted, and there is no diastema between it and the canine. The parastyle on M<sup>1</sup> is better developed and the internal cingulum is continuous. M<sup>2</sup> has a greater transverse diameter for its length and is more advanced.

## MEASUREMENTS OF TEETH OF DIDYMICTIS ALTIDENS (IN MILLIMETERS)

	Length	Width
P <sup>1</sup> -M <sup>2</sup> .....	58.5	-----
P <sup>1</sup> -M <sup>2</sup> .....	29.5	-----
M <sup>1</sup> .....	9.0	17.0
M <sup>2</sup> .....	5.0	9.0

## Genus MIACIS Cope

## MIACIS cf. LATIDENS Matthew

U.S.N.M. No. 18448, right maxillary fragment with M<sup>1-2</sup>, roots of P<sup>1</sup>, and associated skull fragments (loc. No. 48FR80).

This specimen is intermediate in size between the types of *M. cinguis* and *latidens* (Matthew, 1915a, p. 33-35). It agrees with the former in the extended parastyle on the upper molars and with the latter in that the paracone is much larger than the metacone. The internal cingulum is interrupted medially below the protocone. Matthew (1915a, p. 33) states that it is continuous in both species but the illustrations show it to be the same as in this specimen. Although M<sup>1</sup> shows considerable wear, there is a suggestion of a small hypocone, and this specimen may be prophetic of *M. parvirovus* of the Lower Bridger.

## MEASUREMENT OF TEETH OF MIACIS CF. LATIDENS (IN MILLIMETERS)

	Length	Width
P <sup>1</sup> -M <sup>2</sup> .....	16.5	-----
P <sup>1</sup> .....	7.7	-----
M <sup>1</sup> .....	6.0	8.4
M <sup>2</sup> .....	4.0	8.0

## Genus VULPAVUS Marsh

## VULPAVUS AUSTRALIS Matthew

U.S.N.M. No. 18449, left mandibular fragment with M<sub>1-2</sub> (loc. No. 48FR76).

This specimen does not permit anything to be added to Matthew's (1915a, p. 39) discussion of the species.